IN THE CLAIMS:

1. (Currently Amended) A multiplexing/demultiplexing system comprising:

a multiplexor comprising:

a first plurality of optical switches having a plurality of outputs;

a first plurality of optical delay elements coupled to and selectively actuating said optical switches;

a source of optical light coupled to said delay elements; and

an optical combiner coupled to said plurality of outputs and a source of framing pulses.

2. (Original) The multiplexing/demultiplexing system of claim 1, further comprising:

a demultiplexor comprising:

a first splitter;

a second splitter coupled to said first splitter;

a threshold detector coupled to said first splitter;

a second plurality of optical delay elements coupled to said threshold detector; and

a second plurality of optical switches coupled to said second splitter and said second plurality of delay elements.

3. (Original) The multiplexing/demultiplexing system of claim 1, wherein said first plurality of optical switches comprise a saturable absorber switch.

4. (Original) The multiplexing/demultiplexing system of claim 3, wherein said saturable absorber switch comprises a saturable absorber having quantum dots.

5. (Original) The multiplexing/demultiplexing system of claim 4, wherein said quantum dots are comprised of one or more of the group of Lead Sulfide, Lead Selenide, Indium Phosphide and Indium Arsenide.

6. (Original) The multiplexing/demultiplexing system of claim 4, wherein said saturable absorber comprises cladding coupled to said quantum dots.

7. (Original) The multiplexing/demultiplexing system of claim 4, wherein said quantum dots are manufactured using a colloidal growth process.

8. (Original) The multiplexing/demultiplexing system of claim 1, wherein said first plurality of optical switches comprise a Nonlinear Optical Loop Mirror.

9. (Original) The multiplexing/demultiplexing system of claim 1, wherein said first plurality of optical switches comprise a Mach-Zender interferometer.

10. (Original) The multiplexing/demultiplexing system of claim 1, wherein said source of optical light is a laser.

11. (Original) The multiplexing/demultiplexing system of claim 1, wherein said first plurality of optical switches have a plurality of control beam inputs, and said first plurality of optical delay elements are coupled to said control beam inputs.

12. (Original) The multiplexing/demultiplexing system of claim 1, wherein said multiplexor has a plurality of time slots, and said first plurality of optical delay elements have time differences substantially equal to said plurality of time slots.

13. (Original) The multiplexing/demultiplexing system of claim 2, wherein said threshold detector detects the framing pulses.

14. (Original) The multiplexing/demultiplexing system of claim 2, wherein said second plurality of optical switches comprise a saturable absorber switch having a saturable absorber.

15. (Original) The multiplexing/demultiplexing system of claim 14, wherein said saturable absorber comprises quantum dots.

16. (Original) The multiplexing/demultiplexing system of claim 2, wherein a first delay element of said second plurality of optical delay elements has a first time delay of X, and a second delay element of said second plurality of optical delay elements has a second time delay of 2X.

17. (Original) The multiplexing/demultiplexing system of claim 2, further comprising a plurality of amplifiers coupled to said second plurality of optical delay elements.

18. (Currently Amended) An optical multiplexor comprising:

an optical switch array having a plurality of inputs to receive optical signal pulses and a plurality of outputs;

a plurality of delay elements coupled to and selectively actuating said switch array;

a laser coupled to said delay elements; and

an optical combiner coupled to said optical switch array outputs and having an input to receive optical framing pulses.

19. (Original) The multiplexor of claim 18, wherein said optical switch array comprises a plurality of saturable absorber optical switches.

20. (Original) The multiplexor of claim 19, wherein each of said saturable absorber switches comprises a saturable absorber having quantum dots.

21. (Original) The multiplexor of claim 20, wherein said quantum dots are comprised of one or more of the group of Lead Sulfide, Lead Selenide, Indium Phosphide and Indium Arsenide.

22. (Original) The multiplexor of claim 20, wherein said saturable absorber comprises cladding coupled to said quantum dots.

23. (Original) The multiplexor of claim 20, wherein said quantum dots are manufactured using a colloidal growth process.

24. (Original) The multiplexor of claim 20, wherein each of said saturable absorber switches comprises a control beam input, and said plurality of delay elements are coupled to said control beam input.

25. (Original) The multiplexor of claim 18, wherein said optical combiner generates a time division multiplexed output signal.

26. (Original) An optical demultiplexor comprising:
an optical switch array;

a first splitter having an input to receive a multiplexed optical signal;

a threshold detector coupled to said first splitter;

a second splitter coupled to said first splitter and said optical switch array;

a third splitter coupled to said threshold detector and said optical switch array.

27. (Original) The demultiplexor of claim 26, wherein said optical switch array comprises a plurality of saturable absorber optical switches.

28. (Original) The demultiplexor of claim 27, wherein each of said saturable absorber switches comprises a saturable absorber having quantum dots.

29. (Original) The demultiplexor of claim 28, wherein said quantum dots are comprised of one or more of the group of Lead Sulfide, Lead Selenide, Indium Phosphide and Indium Arsenide.

30. (Original) The demultiplexor of claim 28, wherein said saturable absorber comprises cladding coupled to said quantum dots.

31. (Original) The demultiplexor of claim 28, wherein said quantum dots are manufactured using a colloidal growth process.

32. (Original) The demultiplexor of claim 27, further comprising a plurality of delay elements coupled to said third splitter.

33. (Original) The demultiplexor of claim 32, wherein each of said saturable absorber switches comprises a control beam input, and said plurality of delay elements are coupled to said control beam input.

34. (Original) A method of multiplexing an optical signal comprising:

receiving a plurality of optical input signals;

receiving a framing pulse signal;

inputting each of said optical input signals to an input of a respective one of a plurality of optical switches;

providing a light source to a plurality of delay elements;

inputting an output of each of said delay elements to a control beam input of the respective one of the optical switches; and

combining outputs of said plurality of switches with the framing pulse signal.

35. (Original) The method of claim 34, wherein said optical switches are saturable absorber switches.

36. (Original) A method of demultiplexing an optical signal comprising:

receiving a multiplexed optical signal having framing pulses and data pulses;

dividing the framing pulses from the data pulses;

splitting the framing pulses;

delaying at least one of the split framing pulses;

inputting said split framing pulses to a control beam input of an optical switch; and

inputting the data pulses to a switch input of the optical switch.

37. (Original) The method of claim 36, wherein said optical switch is a saturable absorber switch.